The following were elected correspondents:

Prof. O. C. Marsh, New Haven, Conn., and Prof. Wm. H. Brewer, New Haven, Conn.

Pursuant to the By-Laws, an election of members of the Standing Committees for the ensuing year was to be held, but was deferred until the next meeting for business.

On favorable report of the committee the following paper was ordered to be published:

On a new genus in HOMOPTERA,—(Section Monomera.)

BY HENRY SHIMER, M. D.

Characters for a supposed new Family.

DACTYLOSPHÆRIDÆ, Shimer.

Wings four, carried flat on the back in repose.

Antennæ few, jointed.

Tarsi composed of one joint, terminated by two claws, and from two to six *digituli.**

Honey-tubes none; otherwise resembling *Aphidæ.*

DACTYLOSPHÆRA. New genus.†

Male—Anterior wing with one one-branched discoidal, and a stigmatic nervure; posterior wing with no discoidal.

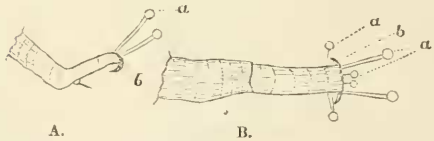
Female—Apterous, body thick, clumsy, subellipsoidal.

Common Characters—Antennæ 3–4 jointed. Tarsi, six digituli. Promuscis sheath four-jointed.

DACTYLOSPHÆRA GLOBOSUM, n. sp.

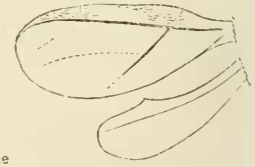
Inhabits galls on the Pig-nut Hickory, (Carya glabra.)

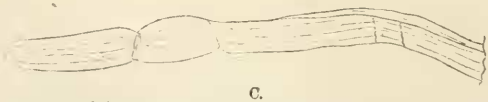
Male—Abdomen and prothorax orange-yellow; mesothorax, head and eyes, blackish; legs and antennæ dark cinereous. Wings hyaline, broad, somewhat overlapping as they lie horizontally on the back. Anterior wing, even-



A.—a side view of the foot of *D? vitifoliæ* magnified; *a*, the two *digituli*; *b*, the claws.

B.—a vertical view of the foot of *Dactylosphæra globosum*, from above, magnified; *a*, the six *digituli*; *b*, the claws, as they may be seen while the insect attempts to walk on the glass plate of a microscope.





C.—the promuscis sheath of *D. globosum.*

D.—Upper and under wing of *Dactylosphæra? vitifoliæ* greatly magnified. This figure was drawn from the only specimen I have remaining, (from the Clinton grape gall.) The dotted lines in the anterior wing are what I saw under the microscope in the recent specimen; the shading between the costal and subcostal nerves represents a hazy appearance, as I saw it under the microscope. The vein in the posterior wing is very obscure, but I saw it with an excellent simple lens.

* I suggest this name, *digituli*, from the Latin *digitulus*, a small finger or toe, for these remarkable organs: it appears to me appropriate, because they are arranged around the foot somewhat like the toes of an animal.

† From δακτυλος, a finger or toe, and σφαῖρα, a globe, on account of the slender globe-ended appendages of the tarsi,—*digituli.*

ly rounded on the posterior margin; anterior margin rather straight, somewhat curved, convex at the middle of the stigma, apex quite broadly rounded, the wide wedge-shaped base not extending beyond the middle; stigmatic nervure nearly straight, terminating in the centre of the apex, not visible at either end. The discoidal within the middle of the wing, not visible at its outer end, somewhat convex anteriorly, its branch hyaline at its extremities; stigma honey yellow, darkest on the costal margin, the apical end lanceolate; inwardly extending to the base of the wing, all the costal space being of the same color. Posterior wing, one longitudinal vein and no discoidal. Tibiæ and tarsi with a few scattering hairs; claws pale flesh horn-colored, with blackish tips. Antennæ four-jointed, sublinear, 1st and 2d short and thick, the others long, the third on a narrow pedicel, which may be a small joint, fourth clavate. Length to tip of wings ·07 inch; body about ·025 inch long.

Female much resembling the "grape leaf louse," (*D? vitifoliæ*), but smaller, the dull pointed promuscis blackish at the extremity; eyes of few (about five) facets.

Eggs similar to those of the "grape leaf louse." Smaller and of a deeper yellow.

Pupa of male orange-yellow, sometimes inclined to greenish; undeveloped wings pale yellow; body somewhat elongate; abdomen pointed; antennæ linear, three-jointed, 1st thick, subglobose; 2d smaller, short, thick; 3d very long, clavate, obliquely pointed, without a spine at the apex, a spine on the inner side of the first and second joints.

Gall variable in size, often numerous in the parenchyma of the leaf, others on the veins and leaf stalks, all opening on the lower side of the leaf, with a very small orifice; smoothish, of a somewhat leathery structure, pale yellowish-green, glaucus or dark green; subglobose or sometimes somewhat irregular, without any of the mealy sugary dust within, which is common in galls of the *Aphis* family.

There is apparently a disposition among some authors to create separate species out of the insects inhabiting galls thus variable, according to their size and location. The small subglobular galls, about ·09—·14 in. in diameter, in the plane of the leaf, and about ·04—·06 in. in a perpendicular direction through it, are often very abundant, and when quite full of eggs I have counted about 50; the young larva usually leaves the gall as soon as hatched, and proceeds, as does the "grape leaf louse" (*D? vitifoliæ*), to construct a new gall; sometimes these small galls contain several females, but I have never found males in them; the male-producing galls are larger, of various sizes, up to ¼ of an inch or even more in diameter. During the summer and autumn and former years, I have examined many of these galls, some of them are globular, others somewhat irregular. In my original studies I took notes of them as distinct species; they were on the leaf-stalks, veins, and in the parenchyma, occasionally near the border of the leaf, most frequently in the parenchyma of the leaf, close to the veins and midribs, so that at first view I was led to believe that they were originally formed in the latter, but upon dissection I found them usually entirely in the parenchyma, the gall freely separating from the veins; these were filled with eggs, larva, pupa, and imago.

The winged males were numerous, but, as the weather then was very wet, they were in an extremely bad condition, their wings adhering to the walls of the galls and to their own bodies from the excessive dampness in the galls; but among the hundreds observed I saw a number of perfect specimens. Subsequently, in more pleasant weather, I examined several dark green, more perfectly globular galls, located as those observed before, with a good supply of winged specimens in perfect condition. I made careful examination and notes as before, and found that they agreed with the former precisely and compared favorably with the former dried specimens; and furthermore, I made a careful microscopic examination of the larva in comparison with

those in the small galls above alluded to, and I could detect no difference; both kinds existed on the same leaves frequently, and sometimes on different leaves of the same tree; other trees have numerous galls all of the small size; in none of these small galls, after the most diligent search, have I ever been able to find a winged male. The conclusion that I have arrived at is that the galls that produce the winged males develope to a larger size, so as to make room for the coming winged inhabitant, on the great principle or law of nature that provides for the wants of every creature, often in a mysterious manner. These small subglobular galls could not conveniently accommodate the winged males. The male-producing grape leaf gall, also, is very long and well developed, so far as my limited observations have extended, while galls containing fertile females are variable from large to even quite small. From my examinations of these Hickory-leaf gall insects, I never saw the males support themselves by their wings, although they attempted flight when dropped properly from the point of a needle; the atmospheric temperature then was moderately cool, which may account for their weakness. When they attempt to fly, the hook of the posterior wing clasps the thickened posterior border of the anterior wing, but not when at rest. The male of the grape leaf (*vitifoliæ*) gall insect also thus made several ineffectual attempts at flight, but was not able to support its body; how this might be in a very warm sunny day I did not have the privilege of determining.

During my microscopic examinations I became convinced that the apparent enlargement of the posterior border of the anterior wing of these insects, is not a developement of a nervure or a mere tumefaction of the border, but a rolling up of the margin like a scroll, which much more admirably fits it for a permanent retaining point for the hook on the anterior margin of the posterior wing.

To make a thorough examination of the feet and their appendages, the living insect is the only material from which it can be satisfactorily done. The *two* claws, as in the case of the "grape leaf louse," can be easily seen as the insect attempts to walk on the glass plate. The tarsi of the larva and female only have two conspicuous digituli, but the male, as it approaches the imago state, develops six; these I observed in the pupa, being the most convenient state for the examination of these organs; those in the middle, between the long or principal pair, are not always so conspicuous, but may be plainly seen under proper circumstances; more frequently they appear as one short stub-like spine.

The knobs on the extremities of the principal digituli, over the claws, are globular, while those on the middle and lateral ones are obovoid and comparatively small.

The legs, feet, etc., of the male imago are much longer than in any other state, hence they appear to be the best material for satisfactory examination, regarding the problem of one or two joints for the tarsi. While the insect was walking slowly under the microscope, I beheld, in a vertical direction, that the tarsi are composed of at least three rings or segments, none of which presented a movable joint; I then crushed the abdomen, but did not injure the thorax; by this means I brought some of the legs on the side, so that the joints moved in a plane parallel with the glass plate; this also had the advantage of confining the insect to the spot, and, as I did not injure the thorax, I had a fair opportunity of examining the tarsi for a long time, with the advantage of such motion as I desired while the insect struggled for freedom; this view of the tarsi demonstrates that they are composed of four rings soldered together, none of them gave the slightest joint-like motion; the upper ring is the most plainly distinct from the succeeding one; on the under side of the foot I beheld some constriction, but on the sides and above there is none; I observed this with great care, but saw no motion, the bending of the foot being confined entirely to the articulation of the tarsus with the tibia. I then, by way of comparison, examined, under similar circumstances,

the foot of a species of *Aphis*, abundant on the apple trees, and saw it composed of the same number of rings; the upper one at its union with the succeeding showed some constriction, as seen either from *above* or from the side view; moreover the motion of a joint was very satisfactorily seen, the insect sometimes bending it alone, at other times in conjunction with the tibio-tarsal joint.

Now, in view of these facts, I can see no reason for claiming two joints for the tarsi of this insect. It would be as reasonable to suppose that each primary ring was a joint, and then we would have four, which, with the digituli that might be the representatives of another joint, give five undeveloped joints—joints in embryo—the highest number in the more perfect *Insectians;* but in the case of this and other species of this family, which I have observed, all are soldered together. By extending my examinations to the tibia I found it composed of about 50 similar primary rings, each one of which was plainly widened from above downward, thus agreeing in the general structural anatomy with the tarsus. This same primary annulated structure I beheld in the antennæ of these insects, also in several species of Aphidæ to which I extended my observations by way of comparison.

Frequently the distal or wide end of these primary rings is prolonged into spines, &c., more or less numerous according to the species of insect. These observations give us a view of the true primary anatomical structure of the long members of insects, for this annulated structure very probably exists in the long members of all insects, although not so readily detected, in many cases, as in the translucent limbs of these insects. Furthermore, these observations lead us to be careful about pronouncing upon the number of joints in the tarsi. To designate each one of these rings as a true joint would lead us at once into inconsistencies, for any anatomist could not presume that the tibia is composed of 50 joints, or the antennæ of this insect, and many species of the *Aphidæ*, of perhaps hundreds; hence, where we behold in the tarsi precisely the same structure, we are no more justifiable in ascribing to it 4 or 5 joints, or even *two*, without beholding the motion of a joint, or the usual constriction. In view of these facts I have made extended and careful observations on the tarsi of these insects, and have become entirely satisfied that there is but *one* joint. These are my reasons for believing that these insects belong to a new family between the *Aphidæ* and *Coccidæ*.

The promuscis sheath of this insect I examined under more favorable conditions than that of the "grape leaf louse," and clearly saw four joints; and if, as I believed, there are two in close proximity, as shown in the magnified sketch at *a*, fig. C, on page 1, there are five joints, while in the latter I did not succeed in distinguishing more than three; perhaps with proper material the same arrangement may be discovered in the latter as in the former species. In *D. globosum* I had an abundance of male pupæ and winged imagos for examination, while in the *D? vitifoliæ* I was chiefly confined to females and larvæ. The bundle of setæ I could not separate, although I made numerous examinations, with the living insect on its back, for the purpose of ascertaining positively. I often saw the insect take hold of it by grasping it between the claws and the foot, pulling and bending it in various directions, sometimes seizing it with two feet and pulling in opposite directions, yet I could not determine more than one piece.

DACTYLOSPHÆRA? VITIFOLIÆ * (The "Grape leaf louse.")

Pemphigus vitifoliæ, Fitch, 1st and 2d Reports, p. 158. Walsh, Practical Entomologist, vol. i., p. 111.

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* Not wishing to multiply genera unnecessarily, I have not constructed a new genus for this insect, but my convictions are that there are characters that probably warrant its separation from *Dactylosphæra*, according to custom. The stigmatic nervure was absent in all the specimens I saw, but upon close examination with a microscope of moderate power, in one specimen I imagined that I saw part of a faint dark line in one wing, where it might be sought for. The branch of

Inhabits galls on the grape leaf, tendrils and vine.

Male—Body moderately slender; abdomen sharply taper-pointed, with a few scattering hairs at the extremity: head short; neck thick. Body, head, legs, and antennæ light yellow, the two latter palest; a broad dark band encircling the middle of the thorax. Wings membranaceous, hyaline; in repose, somewhat overlapping, rather wide or diverging behind the extremeties; in the only entirely perfect specimen observed were slightly curved upwards. Anterior wing widest in the middle, subobovate; posterior margin one regular curve or arc of a circle from the base to the outer extremity; apex completely rounded and comparatively broader than I have observed of our common *Aphidæ;* anterior margin irregularly convex, the greatest convexity being somewhat nearer the basal extremity, where it is considerably rounded forward; a small, inconspicuous costal, and a yellowish strong subcostal nerve; one dark discoidal springing from about the basal third or fourth of the subcostal and shading off or becoming lost in the membrane before reaching the border; outlines of these nervures rather hazy, obscure, not sharply defined;† a long, very obscure branch passes longitudinally from near the middle of the discoidal, in some specimens scarcely, if at all, perceptible; part of the costal space near the base, and an imperfect, undefined stigma, light fulvous. Posterior wing, small, narrow; no discoidal nerve; subcostal scarcely perceptible, somewhat near the costal. Tibiæ and tarsi with a few hairs or spines, a somewhat prominent one beneath the foot near the joint. The digituli, with their conspicuously globular extremities, arise from the extremity of the tarsi, just above the claws, and project beyond the long subcylindrical tarsi about one-half their length, and about four times the apparent length of the comparatively thick, much curved, light horn-colored claws, as held when walking; these slender, almost hair-like appendages or fingers are smooth, slightly curved downward, not tapering to the extremity, terminates in an abrupt, complete globe of about two or three times the diameter of the pedicel. Antennæ long compared with those of the female, but moderate when compared with those of some Aphidæ; pale whitish-yellow, inserted before the eyes, they usually appear three-jointed, (and will be thus considered when examining with a good pocket lens, and more especially in the dried specimen, where we have not the advantages of motion under the microscope, so invaluable in the living specimen.) The extreme joint being very long, and under a higher power annulated with about 25 fine grooves, the marks of the primary rings; but in

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the discoidal is so very obscure as to be easily overlooked, and, being a microscopic character, might be rejected, but if retained we still have the generic characters differing from *Dactylosphæra*, viz.: Anterior wing with one one-branched discoidal. Antennæ 3—8 joints. Tarsi *two* digituli. In case, however, the characters given above should be sufficient to separate, generically, *vitifoliæ* from *D. globosum*, I would propose the generic name of *Viteus* for the former.

† I wish to be clearly understood regarding what I saw of these wing characters. Very probably they will not all be admitted as existing characters by closet investigation of the dry specimen. My examinations were all made in the recent state. With a good lens the discoidal nerve can be seen not as a clear, sharply defined rib, but as an obscure, hazy, margined line: the same may be said of the subcostal nerve which, however, is much plainer, the discoidal branch not observable.

With a good compound microscope, of different increasing powers, something more can be learned in the *recent* state. All the veins are in an imperfect or partially developed state; the walls of the tubes are not so completely formed as to present the sharply defined lines observable in higher developed insects, and with sufficient power to discover the primitive cells, we behold them piled up on each other—great blocks of microscopic masonry—the foundations of the walls of the *veins*. Looking through the centre of the forming tube, the field appears more transparent, because we do not look through so great a depth of the imperfect tube walls as at the side; this central transparency of these hazy lines in the wing is, furthermore, an evidence that it is a channel for the circulation of the blood. The margins and terminations of these veins appear hazy because the cells are in a loose or diffuse state. In most insects the walls of the veins are completed, hence the ribs are clearly defined. These remarks are peculiarly adapted to the *discoidal* nervure, where the cells that nature has provided for the construction of the tube of the vein are to be seen to good advantage between the membranes of the wing. The branch of the discoidal is a very slender capillary tube, with similarly imperfect walls. I saw in one wing a faint trace of a capillary stigmatic nervure in a small part of its course. The subcostal nerve of the posterior wing is in the same undeveloped condition and almost capillary—microscopic. I examined, thus, every portion of the wings of my specimens, elsewhere I saw no trace of nerves, only the uniform

one specimen I fairly succeeded in resolving this extremity into five joints, making in all really seven joints somewhat nearly equal; first joint tumid, very short; second short and thick also, but much smaller than the first, truncately rounded at the outer end, with a somewhat prominent spine projecting from the anterior margin and a solitary capillary hair of equal length; third connected with the second by a narrow pedicel; fourth slender, small: thence the joints become gradually thicker towards the last; fifth longest, about equal to the third with its pedicel; sixth shortest excepting the basal; seventh becoming obliquely tapering towards the apex, which sustains three short spines. The pedicel, between the second and third, may be a very small joint, (of which I am convinced, giving really 8 joints in all,) but of its existence I am not certain by ocular demonstration, therefore I do not give it place as a positive character. The numerous grooves in the antennæ much resemble the line of union of very short closely embracing segments soldered together, and are doubtless primary rings of embryonic development. Length to the tip of the wings about ·07 inch.

Female yellow, tumid; abdomen gradually tapering to a short point: clumsy, making little or no progress on a smooth surface, somewhat variable in size, appearing, to the naked eye, not much unlike a yellow immature grain of common purslane (*Portulàca oleracea*, L.) seed. Like the *Termite*, increasing in size and fertility as pregnancy continues; its average length being somewhere about three-hundredths of an inch; segments more conspicuous above and beneath than on the sides; the globular-ended, or knobbed hair-like digituli of the tarsi plainly seen projecting beyond all the feet about half their length, fornicate cylindraceous; also on each side of these, there is a prominent, accuminate, hair-like spine, and between them a short spine of about, or somewhat less than, half their length. Antennæ 3-jointed, transversely rugose or imperfectly annulose, nearly naked, sublinear, situated on the forehead in front of the eyes; first segment tumid or subglobose, short, of much the greatest diameter; second short, intermediate in diameter between the first and third, with a small spine anteriorly; third exceeding the first and second in length, subfusiform, the obliquely pointed apex shortly bifid; eyes small, few facets. Promuscis arising from about the anterior fifth, in a thick reclining stump-like base; sheath three-jointed (?), usually lying on the breast.

Larva somewhat depressed, elongate-elliptical, in the field of view from above; moderately active, yet slow when compared with other insects; in the field of a microscope of low power it can be examined with a good degree of satisfaction before it travels beyond the field of view; color light yellow-prasinous; feet and antennæ as in the perfect female.

Egg prolate spheroidal; length about 2½ times the width; pale greenish-white; to the naked eye visible only as a fine dust point.

Pupa of the male somewhat longer and more slender than the mature female, browner; legs longer, much more active; the short, brown, imperfect wings diverging obliquely down the sides; antennæ as in the mature female.

Gall.—The *vitifoliæ* gall always opens on the *upper* side of the leaf, while the gall of *Dactylosphæra globosum*, on the leaf of the Pig-Nut Hickory, (*Carya glabra*), always opens on the *lower* side, and both are alike in being free from any of the sugary dust, so common among the gall-producing *Aphidæ*. It is subglobular, quite rough on the outside, and of variable size, according to the age, &c., well developed galls attaining the size of a pea. They are often very numerous, almost covering the leaf, and in many cases the leaf is destroyed before the gall becomes fully developed; occasionally they are located on the

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thin cellular tissue connecting the two walls of the wing-bag. These are facts that I believe worth recording; others may receive them for what they are worth in classification. I can see here somewhat satisfactorily the same plan of neuration, in an embryonic state, as given for the genus *Dactylosphæra*, and I will not be surprised if specimens yet be found in a better state of development. The wing neuration of *Dactylosphæra* is synonymous with that of *Phylloxera*, (Proc. Ent. Society, vol. i., p. 297, fig. 8,) it is therefore upon the other characters that I found this genus.

leaf stalks, tendrils and vine itself; these latter some authors are inclined to refer to a distinct species, but as they are associated with those on the leaf, and as there is no observable anatomical difference between the egg, larva and female of these and those on the leaf (as I have shown elsewhere), it is quite inconsistent to believe that there is a specific difference. The young larva leaves the gall, usually, soon after being hatched and resorts to the tender leaf as it is expanding from the bud, fixes its location, where it feeds by puncturing the leaf and sucking the juices; this irritation causes an abnormal development of the leaf and thus produces a cup or bottle-like excrescence or gall in which the insect now developes to a mother and where she resides, laying eggs, during the remainder of her life; from 50 up to even 5000 eggs may be found with her at once, and one female may be the progenitor of many millions in one season, even 10,000,000,000,000,000, as I have shown in the *Practical Entomologist*, vol. 2, page 17. Sometimes a few of the female larvæ, from some cause, appear to remain in the gall until maturity;* at other times the galls are so closely located that two or three are blended into one irregular gall, with as many primary parents. This disposition to, in a measure, form colonies, while the coccus spirit of emigration also prevails, is another evidence that this insect forms the connecting link between the *Aphidæ* and *Coccidæ*. Much might be said regarding these galls, their enemies, &c., but they have been in a measure recorded in various publications.

HOW TO CONDUCT EXAMINATIONS.

The antennæ of these insects can easily be examined with a common botanical microscope, as I have often done; for this purpose the young larva is as good or perhaps better than an old female, but it travels so rapidly that it is impossible to keep it long enough in the field of a *good* microscope to make a satisfactory examination of the feet—the all-important organs in family classification here; and if on the back the incessant motion of the legs, sweeping through the field of vision so rapidly, gives a very poor and unsatisfactory view. But for a thorough examination I must insist on putting the living insect under a good microscope, and although the pregnant female is a clumsy, globular looking mass, with the legs apparently so close on the body as to be nearly out of view, yet I find it the best state for examination, and it will lie on its belly, side or back, as we may place it, long enough to examine it carefully, especially when pretty cool; if we place it on the side or back we can get a very good view of the feet, and we can see to good advantage the digituli, curved from above downward, and also the movement control that the insect has over them, diverging, approximating, elevating and depressing them; under a poor glass these will be mistaken for long slender claws, but the true claws will be seen just beneath them, and when on the back or side with the leg projecting out leisurely from the body or sweeping through the field of vision, I have watched them for many hours without being able to solve the problem of one or two claws, so close does the insect keep them when they are curved in under the foot, as they always are when in these positions. But place it on its belly on the smooth glass plate, and it vainly struggles without being able to move from the spot: it thrusts out its legs, and, as might be supposed, naturally enough spreads every organ of the feet, over which it has muscular control, to aid locomotion; looking from above downward we see the long hair-like digituli, with their globular ends, sweeping over the glass plate; the globe not becoming distorted or brushed off, we are convinced that it is not a

* I would here raise the inquiry, inasmuch as *winged* males are so very rare, may not some of these supposed females be apterous males, especially in those perfectly round galls, apparently made by one mother, wherein we often find several apterous female-like imago, usually somewhat smaller than the one original parent of the colony? Otherwise, how can we account for the fertilization of the eggs that are to pass the winter? *Winged* males certainly, on account of their extreme rarity, do not fertilize many; yet from appearances, their numerous enemies, their great liability to destruction from every cause, and with all their great abundance, many certainly must become fertilized from some source. This is a point yet open for investigation.

[Jan.

liquid exudation, but a true solid member of the body; its hair-like pedicel may be seen occasionally to bend, thus proving its pliability; the pedicels, as well as the globes, are translucent, and without doubt are composed of the same leathery structure as other parts of the skeleton, and in the cast skin they appear as perfect as in the living animal; these are remarkable appendages, entirely unlike anything which we ordinarily see in the anatomy of insects. Burmeister, in his admirable *Manual of Entomology*, so far as I at present have it in remembrance from thorough study some years ago, fails to observe anything of the kind, and I can only conjecture that their use is to enable this small insect to climb with safety over the down of the tender grape leaf, with which it is abundantly supplied, when the down and hairs are so long as to prevent the ungues from reaching the bark. This instrument is admirably adapted to lock firmly between the projecting hair and down of plants, and convey the insect through this forest of down with safety. The globe on the end may also possibly be a gland, secreting a viscid substance, but of this I have no ocular demonstration. On either side of these digituli we see a diverging spine nearly equalling them in length, and between them we see a short stub or spine-like body, less than half their length. I have not minutely examined this, having only seen it in the field from above; it may probably be the spurious claw—*pseudonychia* of Burmeister, or undeveloped digituli. Beneath these the claws, one on each side, can be plainly seen widely spreading on the smooth glass as the insect vainly struggles to move forward; these claws are much curved, short, and comparatively thick and strong, appearing light horn-colored under a good achromatic microscope.

With such an armor as this we cannot help viewing with admiration the wonderful adaptability of nature to the wants of so frail a creature; by the means of the four-fingered and two-clawed hand, as it were, alone, it can travel with as much safety from the parent gall, far below on the vine, up over the forests of down that it may encounter on the plant in its progress to the tender bud, as the monkey travels over the tops of the trees in the dense jungles of tropical climes; without these, amidst the atmospheric storms, it must fail to reach the tender bud, where alone it is able to construct a new gall and repeat the work of its parent and fulfil the unworthy object of its being.

While the insect is on its back, to examine the tarsi, promuscis, &c., you will not fail to observe the manual dexterity displayed as it seizes hold of the promuscis and setæ, with this hand-like organ, and pulls them away to one side as it struggles and kicks in the vain effort to right its position. Perfectly at home in the snug tenement—its gall—it is almost as unhappy on the hard smooth glass-plate of a microscope as a fish is on dry land, unwillingly a martyr to science.

To examine the nature of the articulations you will prefer a larva; they are very imperfect, appearing externally like a mere thinning of the leathery structure of its limbs, with no well-defined line of union between the tibia and tarsus; this dermal membrane about the joint wrinkles as it bends the organ in locomotion; the lower end of the tibia projects into a prominent heel on which it treads heavily.

I believe that the females are never winged in any season of the year, if they are in the spring they are not much used. I see here grapes, not more than one hundred yards from the vines, so completely covered with them, entirely free, and have thus remained during three summers, while another cluster of grapes taken in the early spring from among the affected ones and planted at some distance in another direction, are in like manner affected. This fact, in a measure, is confirmatory of my former conjecture, that these insects probably survive the winter in galls on the tendrils and vine stalk, or it may be occasionally that the egg, falling into small crevices in the old bark, thus passes through the winter. If there is any freezing of these eggs, the burying of the vine in the earth and snow affords them protection. Now, as the leaves are falling, many of the galls are full of eggs and very few of them are hatching, and with the

increasing coldness of autumn it will cease altogether; soon after falling the leaf dries and consequently the gall shrinks and gapes open; thus many of the eggs can fall out on the ground around the roots, and in this way chiefly do they survive the winter. In transplanting they are conveyed with the earth around the roots. In the early warm summer weather these eggs hatch and the young louse, instinctively, resorts to the vine and ascends to the leaf in quest of food. Thus they are perpetually preserved about the once affected vine and removed from place to place in transplanting.

Their natural enemies may hold them in check, but will never subdue them. When they become too numerous to obtain a sufficient supply of their insect-food readily everywhere they die of starvation, while some of these lice are still living in security enough to continue the species. Their enemies are numerous, and I never go forth to investigate, even now at the end of long years of study, without discovering something new and interesting Their natural history is inexhaustible; insignificant as it may seem to be, it is an object of the deepest interest when we come to the examination with our eyes open to the truths that develop around us and force themselves upon our consideration.

The winged males are very rare, among the rarest of the rare, as I have found by experience, at least in this region. I have opened more than ten thousand galls and never saw but four winged imagos; one I found late in September of last year, and three during the present autumn: two were somewhat imperfect but useful material for examination; two I took from one gall a few days ago, one of them was entirely perfect, it was an admirable specimen for examination; it enabled me to get the precise position of the wings in repose. They are very liable to be crushed or injured in opening the galls, because it is necessary to open them rapidly to make any progress, and a very little water entering a gall causes the wings to adhere, frail membranes as they are, and greatly damages them. I also found three male pupæ and a parent female and eggs in a gall. I failed to raise either of these pupæ; they soon perished after the gall was removed from the vine, refusing to leave the old drying gall for fresh ones placed beside them.

Having thus found four male imagos and seen the pupa, there appears to be no further good reason why I should longer delay the publication of my supposed new genus and family and my observations, except that I wish to forward a supply of them to learned societies, but as they are so exceedingly rare it appears like hoping against hope.

As this is a very common insect it needs a common name, and I think no better could be given it than that suggested in the *Prairie Farmer*, (Aug. 4. 1866,)—"*Grape leaf louse.*"

Mount Carroll, Ills., Oct. 8, 1866.

Note.—My description and the details of my observations of these insects may appear quite prolix, but on account of the various erroneous opinions held by popular authors regarding them, I have been induced to give a pretty minute description of the insects in their *different* states, and the method of conducting my observations, so that others may the more readily verify them, from even larva and females, my only object being the development of truth.

Dr. Fitch locates them in the *Aphis* family, while Mr. Walsh classes them among the *Coccidæ;* they appear nearer the former than the latter. But the "grape leaf louse" certainly bears no generic resemblance to *Pemphigus* as Fitch declares, doubtless, without observation, which is hardly excusable in even the most popular writers.

For what reason, if any, Mr. Walsh could have announced, in the *Practical Entomologist*, vol. i., p. 111 and 112, that the *Vitifoliæ* gall "is the work of an insect, not of a plant-louse, however, as Dr. Fitch supposed, but as I have recently ascertained, of a true bark-louse belonging to the *Coccus* family;" and in further allusion to *his three gall-making bark-lice* unqualifiedly assures us that "any entomologist by examining either the *vitifoliæ* (insect) of Fitch, which I

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find on the wild *Vitis cordifolia* and on the tame Clinton grape-vine, or the gall *caryævenæ* of Fitch, which I find exclusively on the leaves of the Shellbark Hickory (*Carya alba*), and the third—an undescribed gall, the size of a cabbage seed, on the leaves of the Pig-nut Hickory (*Carya glabra*) may easily satisfy himself that the mother-louse inhabiting them does not belong to the *Aphis* but to the *Coccus* Family," &c., &c., *without telling us how to become satisfied that a plainly* TWO-*clawed tarsus belongs to the Coccus family*, is quite incomprehensible, and certainly utterly at variance with their true anatomical characters. My paper discusses two of these *supposed bark-lice*, and I believe that the third is of the same character. Dr. Fitch's "rashness" is here fairly paralleled by the accuser himself, in the same paper, by "fixing the *family* to which a particular larva belongs," as I have abundantly demonstrated. H. S.

Feb. 5th.

MR. VAUX, Vice-President, in the Chair.

Twenty seven members present.

Feb. 12th.

The President, DR. HAYS, in the Chair.

Thirty members present.

The death of R. Kennicott, member, was announced.

Feb. 19th.

The President, DR. HAYS, in the Chair.

Forty-four members present.

The following papers were presented for publication:

"A list of introduced plants, growing in waste ground below the Philadelphia Navy Yard, &c." By Aubrey H. Smith.

"On the Habits of the Cutting Ant of Texas." By G. Lincecum.

The following deaths were announced:

William Norris, a member, on the 5th of January; Brackenridge Clemens, M. D., of Easton, Pa., a correspondent; Prof. Alexander Dallas Bache, a member, at Newport, R. I., on the 17th inst.

Dr. H. Allen directed the attention of the members to some features of interest in the conformation of the mammalian skull, based upon examinations of specimens in the Academy's collection.

Having noticed in the skull of a Kronian negro, in the Wistar and Horner Museum of the University of Pennsylvania, the absence of union between the greater wing of the sphenoid bone (alisphenoid) and anterior inferior angle of the parietal bone, and in its stead a union at that point between the temporal and frontal bones, he was desirous of ascertaining to what extent the variation would be found present in a series of crania. With this object examinations of the human skulls, eleven hundred in number, were made, when the variety was found present in twenty three. With these it was thought to be the result of deficient developement of the great wing of the sphenoid bone, an interspace being left which was occupied by a process of the temporal sent forwards and upwards to articulate with the frontal bone.